

H. S. J. P.

# Rhodora

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## NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—XI<sup>1</sup>

NORMAN C. FASSETT

EXTENSIONS OF RANGES OF AQUATIC PLANTS. In recent years the activities of collectors of aquatic plants in Wisconsin have resulted in several extensions of known ranges. The three men who have contributed most in this field have been Mr. John H. Steenis, working with the Wisconsin Land Economic Survey, Mr. L. R. Wilson, collecting in conjunction with his studies at the Trout Lake laboratories of the Geological and Natural History Survey, and Mr. Neil Hotchkiss of the U. S. Biological Survey. One of the most remarkable finds was that of *Potamogeton confervoides* in Langlade County, extending its known range westward from eastern New York and Pennsylvania.<sup>2</sup> This pondweed was collected by Wilson and Steenis in Greater Bass Lake, near Summit Lake P. O. The lake lies in drift of the Fourth Wisconsin glaciation. Identification of this species has been confirmed by Professor Fernald. Another eastern pondweed found near Summit Lake was *P. Oakesianus*, which was collected in Greater Bass Lake and in the nearby First Lake, and whose range is given in Gray's Manual as "Anticosti to n. N. Y. and N. J." This was also collected by Steenis in the northwest corner of Juneau County, in the bed of Glacial Lake Wisconsin. In the same lake bed is Wisconsin Rapids, where the plant was collected in 1894 by L. S. Cheney. Mr. Cheney also collected it at Stevens Point, just north of the limits of this now extinct lake. *Najas gracillima* has until recently been un-

<sup>1</sup> Published with aid to RHODORA from the National Academy of Sciences.

<sup>2</sup> See Fernald, Mem. Am. Acad. of Arts & Sci. xvii, pt. 1: 33 (1932).



known west of eastern New York;<sup>1</sup> it was collected by Hotchkiss and by Steenis in 1931 in Little Sissabagama Lake, near Stone Lake P. O., Sawyer County. The following summer it was collected by the writer in a small muddy pool west of Wisconsin Dells (formerly Kilbourn); this pool lies in an ancient abandoned channel of the Wisconsin River. Later in the same season it was again found by Mr. Hotchkiss and the writer, this time in the terminal moraine east of Wisconsin Dells, in Kittleson Pond, once close to the waters of Glacial Lake Wisconsin. *Littorella americana* enjoys a reputation for great rarity. It comes as something of a surprise, then, to find that it is a characteristic and abundant plant in many lakes of northern Wisconsin. Due to the efforts of the collectors named above, we now know it from the following Lakes. Sawyer County: Ham Lake, Round Lake, Ashegan Lake, all near Hayward. Douglas County: Round Lake near Gordon. Vilas County: Crystal Lake, Muskellunge Lake, Little John Jr. Lake, all near Trout Lake P. O., Langlade County: Town Line Lake, Summit Lake, Lower Clear Lake, Long Lake, Lower Bass Lake, all near Summit Lake P. O. Shawano County: Shawano Lake.<sup>2</sup> With one exception, only submerged and sterile plants were found. Those at Muskellunge Lake were exposed by lowering of the water-level, and were flowering. It may be that the apparent rarity of *Littorella* is due simply to the infrequency of its flowering, and to the fact that sterile individuals, in deep water, are easily overlooked. They are ordinarily to be found only by dredging, which was the method used by Steenis and by Wilson.

UPPER HOLLY LAKE. This little lake, 12 miles south of Hayward, Sawyer County, was found by Mr. Steenis to be one of the most interesting in the state. The water is very soft (pH 6.5), but while the flora of most soft-water lakes in the region consists of such small and rigid plants as *Elatine*, *Eriocaulon*, *Isoetes*, *Lobelia Dortmanna* and the like, with larger plants absent or rare, Upper Holly Lake has an abundant growth of *Elodea*, *Potamogeton*, *Nymphozanthus*, etc. It is the only very soft-water lake in the region in which muskellunge are found.<sup>3</sup> There are four species of *Utricularia*: *U. vulgaris*, common in medium- to hard-water lakes in the region but usually not in soft water; *U. gibba* and *U. minor*, both very rare in Wisconsin; and *U.*

<sup>1</sup> Fernald, RHODORA xxv, 109 (1923).

<sup>2</sup> Mr. Steenis tells of bathing in Shawano Lake and finding the leaves of *Littorella* stiff and sharp and abundant enough to cause discomfort.

<sup>3</sup> Data concerning Upper Holly Lake from Steenis, in Land Economic Inventory of northern Wisconsin: Sawyer County, p. 63 and table XIII (1932).

*purpurea*, unknown elsewhere in the state. *Potamogeton pulcher*, whose range Gray's Manual gives as "s. Me. to Fla.; and near St. Louis, Mo.," was collected in Upper Holly Lake. It is also represented in the Gray Herbarium, collected at Taylor's Falls, Minnesota, by F. P. Metcalf. *Elcocharis Robbinsii*, recorded in Gray's Manual as occurring "w. to Mich. and Ind.," is abundant on the shores of Upper Holly Lake, and has also been recently collected by Mr. Hotchkiss in Burnett, Polk, Barron and Oconto Counties.

**ELATINE TRIANDRA IN WISCONSIN.** This occurrence was recently reported by the writer,<sup>1</sup> and related to a now extinct glacial lake. Since this report it has again been collected by Mr. Neil Hotchkiss and the writer in Kittleson Pond, 5 miles east of Wisconsin Dells, which, like the pond in which the earlier collection was made, borders on glacial Lake Wisconsin. A collection from Round Lake, 5 miles east of St. Croix Falls, Wisconsin, September 5, 1927, *Fassett & Wilson*, no. 15290, proves also to be this species. This is of special interest because Round Lake bears much the same relation to glacial Barrens Lake<sup>2</sup> that the two neighboring lakes in southern Wisconsin bear to glacial Lake Wisconsin. The three lakes where the *Elatine* has been found are all kettleholes in terminal moraines, and are all so small that each is little more than a large mud-puddle.

The habitat of *E. triandra* seems to be quite different from that of the commoner *E. minima*. The latter species, in the Middle West at least, is always on sandy shores or in shallow water with sandy bottom. *E. triandra*, at its three known stations in Wisconsin, is on muddy shores or in shallow water underlain by soft mud. At its only known station in New England, at Coburn Park, Skowhegan, Maine, which was visited by the writer in 1931, it is also in shallow water and is rooting in a muddy bottom. Since the banks of the pool are overhanging and grassy, so that there is no opportunity for the *Elatine* to grow on the shore, the only form occurring there is the submerged f. *callitrichoides*. Incidentally, an inspection of this locality is sufficient to convince the writer of the correctness of the suggestion<sup>3</sup> that *E. triandra* is not native at that place.

**SILENE CSERHII IN THE MIDDLE WEST.** For some time the writer was puzzled by the presence in the herbarium of two quite different plants, each of which could with Gray's Manual be identified as

<sup>1</sup> Trans. Wis. Acad. xxv. 200 (1930).

<sup>2</sup> See McLaughlin, Ecological Monographs ii. 357 (1932).

<sup>3</sup> Fernald, RHODORA xix. 12 (1917).



*Silene latifolia*. Upon their being taken to the Gray Herbarium, the two species were at once recognized by Mr. Weatherby as *S. latifolia* and *S. Csereii*,<sup>1</sup> respectively. The latter is a native of the Balkan Peninsula and Asia Minor. A study of American material shows the following distinctions:

*S. LATIFOLIA*: calyx campanulate, at maturity only slightly narrowed at summit, rounded at base or in age depressed about the pedicel, the nerves mostly weak, much branched and freely anastomosing; upper bracts of the inflorescence scarious and glabrous throughout.

*S. CSEREII*: calyx ovoid, strongly narrowed at summit, tapering at base, the nerves very little if at all branched; upper bracts of the inflorescence firm and ciliate.

*S. Csereii* is represented in the Herbarium of the University of Wisconsin as follows: MINNESOTA: Pigeon River, Cook Co., August, 1927, *M. R. Shaw*, no. 470. WISCONSIN: Amnicon Lake, Douglas Co., July, 1927, *Shaw*, no. 483; Centuria, July 19, 1924, *J. J. Davis*; Fountain City, July 7, 1922, *H. H. Smith*, no. 7078; Camp Douglas, July 1, 1926, *Davis*; railroad tracks, Lyndon Station, June 30, 1917, *Davis*; Portage, August 10, 1926, *Davis*. INDIANA: on ballast, Gary, June 29, 1909, *L. M. Umbach*, no. 3685. Also recently reported from Linden, Indiana.<sup>2</sup> It is represented in the Gray Herbarium as follows: MONTANA: near Westby, July 7, 1927, *Esther L. Larsen*, no. 74. IOWA: dry gravelly ground, Estherville, September 22, 1925, *B. O. Wolden*; in dry gravelly ground along railroad right-of-way, Estherville, June 15, 1926, *Wolden*, no. 1219. OHIO: ballast, Erie R. R. dump, Phalanx, July 6, 1924, *Almon B. Rood*; pier track, Sandusky, August 14, 1920, *E. L. Moseley*.

MADISON, WISCONSIN.

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EPIFAGUS VIRGINIANA IN MISSOURI.—The absence of Beech-drops in Missouri has long been a puzzle. Beech trees (mostly *Fagus grandifolia* var. *caroliniana*) occur in Missouri only in the southeastern portion of the state, chiefly on Crowley's Ridge, the only area of topographic relief in the lowlands. Over some portions of Crowley's Ridge in southeastern Missouri and on adjacent hills in the Ozark region bordering the southeastern lowland area, as in Perry and Cape Girardeau counties, there are some good stands of beech groves. It would be expected that, as in other areas east and north of Missouri, the beech-drops (*Epifagus virginiana*) could be found in any fair-sized grove of beech trees. However, there have been many attempts

<sup>1</sup> Baumg. Enum. Stirp. Transs. iii. 345 (1816); Williams, Journ. Linn. Soc. xxxii. 49 (1896); Ascherson & Graebner, Syn. Mitt.-Eur. Flora v. pt. 2: 62 (1929).

<sup>2</sup> Deam, Proc. Ind. Acad. Sci. xlii. 48 (1933).

in the past to locate *Epifagus* under beech groves in Missouri, and each has been fruitless. The writer several times searched diligently in late autumn in beech groves in southeastern Missouri without locating the elusive beech-drops, and hope for discovering it in the state had been almost forsaken.

During the month of October, 1933, Mr. J. H. Kellogg was collecting on Crowley Ridge in Scott Co., and in a fair-sized stand of *Fagus grandifolia* var. *caroliniana* found *Epifagus virginiana* in plentiful numbers. A number of eastern and southeastern species are known in Missouri only from the Crowley Ridge and adjacent hill section of southeastern Missouri, and the discovery of *Epifagus virginiana* adds still another eastern species to the list.—JULIAN A. STEYERMARK, Missouri Botanical Garden, St. Louis, Mo.

## DRABA IN TEMPERATE NORTHEASTERN AMERICA

M. L. FERNALD

(Continued from page 344)

17. *D. ARABISANS* Michx. More or less caespitose *perennial*, forming simple or freely forking mats 0.2–2.5 dm. across, the drab or pale-brown mostly forking caudices retaining fibrous shreds of dead leaves, ending in depressed rosettes 1.5–14 cm. across: *rosette-leaves* oblanceolate or spatulate, entire or somewhat dentate, attenuate to a petiolar base, 0.7–7 cm. long, 0.2–1.6 cm. broad, *thin, closely and minutely* (in shade more sparsely and less minutely) *stellate-pannose*, in age sometimes glabrate: *flowering stems* 1–40, slender, simple to freely branching, *with often flexuous* loosely ascending branches, 0.5–4.5 dm. high, glabrous or sparingly to closely *stellate-tomentulose*, rarely with a few spreading and simple trichomes, often glabrate at summit; *cauline leaves* 3–12, oblanceolate, oblong or narrowly obovate, *cuneate to but slightly rounded at base*, serrate-dentate to entire, 0.5–4.5 cm. long, 0.2–1 cm. broad, stellate-pubescent to glabrous: *racemes* corymbiform in flower, *elongating in fruit and rather lax*; the *primary ones* 7–25-flowered, *in fruit* becoming 2–12 cm. long and 1.3–3 cm. in diameter: *pedicels* slender, glabrous or sparsely stellate-pilose, *divergent or arched-ascending*, the lowest 3–15 (rarely –25) mm. long: sepals oblong, obtuse, 1.8–3 mm. long, 1–1.5 mm. broad, glabrous or sparsely hirtellous, white-margined: petals white, broadly obovate, emarginate, unguiculate, 4.5–6 mm. long, 2.8–3.8 mm. broad: anthers 0.5 mm. long: *ovary* glabrous, *with a distinct slender style*: *siliques* very thin, strongly compressed, glabrous, narrowly lanceolate to narrowly elliptic or ovate, *commonly acuminate*, usually twisted but sometimes



plane, 5–15 mm. long, 1.5–3 mm. broad, with slender style 0.5–1 mm. long; the valves smooth and veinless, often lustrous: seeds 12–36, oblong or rounded, 1.1–1.7 mm. long.—Fl. Bor.-Am. ii. 28 (1803); DC. Syst. ii. 349 (1821); Torr. & Gray, Fl. N. Am. i. 106 (1838), in large part; Gray, Gen. i. 160, t. 68 (1848); Fern. & Knowlt. RHODORA, vii. 65, t. 60, fig. 9 (1905); O. E. Schulz, l. c. 275 (1927). *D. Arabis* Pers. Syn. ii. 190 (1807). *D. incana*, var. *glabriuscula* Gray, Ann. Lyc. Nat. Hist. N. Y. iii. 223 (1835). *D. Longii* Schwein. ex Torr. & Gray, l. c. (1838) as synonym. *D. incana*, var. *arabisans* (Michx.) Wats. Proc. Am. Acad. xxiii. 260 (1888). *D. arabisans*, var. *orthocarpa* Fern. & Knowlt. l. c. 66 (1905), in part only and excluding the cited type.—Cliffs and exposed ledges of argillaceous, basic or calcareous



MAP 21. Range of DRABA ARABISANS.

rock, Newfoundland to the Lake Superior region of Ontario, south, rather locally, to New Brunswick, Maine, Vermont, New York, Michigan, Wisconsin and Minnesota.—NEWFOUNDLAND: dry cliffs and talus, Tilt Cove, *Fernald, Wiegand & Darlington*, no. 5463; dry rocks, Snook's Arm, *Fernald, Wiegand & Darlington*, no. 2462; ledges and talus, north bank of Exploits R., Grand Falls, no. 5461; calcareous cliffs, ledges and talus, Bard Harbor Hill, *Fernald & Long*, no. 28,367, *Wiegand, Gilbert & Hotchkiss*, no. 28,368; dryish limestone talus, Doctor Hill, *Fernald & Long*, no. 28,366; limestone near crest (alt. 650 m.), Killdevil, Bonne Bay, *Fernald, Long & Fogg*, nos. 1739, 1740; limestone ledges and talus, Shag Cliff, Bonne Bay, *Fernald, Long & Fogg*, no. 1738; dry limestone shingle and talus, Penguin Head, Bay of Islands, *Fernald, Long & Fogg*, no. 1736; dry limestone talus, Druid's (or Raglan) Head, Bay of Islands, *Fernald, Long & Fogg*, no. 1735; slaty cliffs, McIver's Cove, Bay of Islands, *Fernald, Long & Fogg*, no. 1732; sea-cliffs, John's Beach, Bay of



Islands, *Waghorne*, no. 22; cliffs along shore, near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom*, nos. 10,268, 10,289; talus slopes of marble region between Mt. Musgrave and Humbermouth, *Fernald, Wiegand & Kittredge*, no. 3459; dry limestone ledges and shingle, Hannah's Head, lower Humber Valley, *Fernald, Long & Fogg*, no. 1733. QUEBEC: on shingle, West Point, Anticosti, *J. Macoun* no. 20; dry (inland) calcareous cliffs near Cape Gaspé, *Pease*, no. 20,205; rochers calcaires de la Montagne St.-Alban, vers 300 m. d'alt., *Victorin, Rolland, Brunel & Rousseau*, nos. 17,382, 17,383; talus of calcareous cliffs near Cape Rosier, *Pease*, no. 20,208; calcareous cliffs, Mt. Ste. Anne, Percé, August 18, 1904, *Collins, Fernald & Pease* (*Pease*, nos. 7355, 7356), *Fernald & Collins*, no. 1070, *Victorin, Rolland, Brunel & Rousseau*, no. 17,378, *Pease*, no. 20,241; rocky slope, Round Rock, Grand River, Gaspé Co., June, 1903, *G. H. Richards*, June 30–July 3, 1904, *Fernald*; dry slaty talus of cliffs east of the head of Lac Pleureuse, *Fernald, Dodge & Smith*, no. 25,772; sur les cailloutis calcaires près du Lac Pleureuse, *Victorin, Rolland & Jacques*, no. 33,437; calcareous cliffs and rock-slides by the Gulf of St. Lawrence, Christie, *Fernald & Pease*, no. 25,090, 25,091; trap cliffs at 1800–1900 feet, Tracadigash Mt., Carleton, July 24, 1904, *Collins, Fernald & Pease* (some fruits with 3 carpels); calcareous ledges and cliffs, Bic, many collections, July 16 and 18, 1904, *Collins & Fernald*, July 17, 1904, *Collins & Fernald, Fernald & Collins*, nos. 92, 93 (cotype of *D. megasperma*, var. *leiocarpa* O. E. Schulz), 1066, 1067, 1069, *Rousseau*, nos. 24,833, 26,487, 26,613, 26,695, 26,703, *Victorin, Rolland & Jacques*, no. 33,586; crevices and talus of limestone sea-cliffs, alt. 200–275 m., east of St. Fabien, *Fernald & Collins*, no. 1068; rochers, Île à Deux Têtes, *Victorin*, no. 24,839; argilite, Île aux Grues, *Rousseau*, no. 24,841; Cap à la Branche, Île-aux-Coudres, *Victorin*, no. 4128; sur les roches cambriennes, Grosse-Île, *Victorin*, nos. 15,638, 15,639; dry calcareous cliffs near the shore, Baie St. Paul, *Stebbins*, no. 783; rochers abrupts, Mt. St.-Hilaire, *Victorin*, no. 3867; dry, calcareous cliffs, Gibraltar Point, Lake Memphremagog, *Pease*, no. 11,981. NEW BRUNSWICK: slaty bank, junction of Restigouche and Matapedia Rivers, Quebec-New Brunswick boundary, *Rousseau*, no. 32,335. MAINE: Mt. Kineo, September, 1887, *G. G. Kennedy*; moist ledges, at 1300 ft., Day Mt., Avon, July 24, 1903, *Knowlton*, August 31, 1904, *Knowlton & Chamberlain*. VERMONT: cliffs and summits about Willoughby Lake (Mt. Annance, Mt. Hor, Mt. Pisgah, etc.), many collections from 1854 (*Wm. Boott*)—date; Smuggler's Notch, many collections from 1877 (*Faxon*)—date; "in rupibus ripariis ad lacum Champlain et in Nova Anglia," *Michaux* (TYPE in herb. Michx., Mus. d'Hist. Nat. Paris); Gardiner's Island, L. Champlain, June 17, 1881, *Faxon*, July 2, 1898, *Eggleston*; Four Brothers Island, L. Champlain, June 12, 1908, *N. F. Flynn*; dry ledges, Shelburne Point, L. Champlain, June 25, 1913, *Knowlton*; Charlotte, June 9, 1876, *Pringle*; dry ledges, Mt. Philo, Charlotte, June 5, 1908, *Kennedy*, May 28,

1922, *Knowlton*; Snake Mt., Addison, *Eggleston*, no. 132; limestone cliffs, Cobble Hill, South Bristol, May 28, 1878, *Brainerd*; Mt. Eolus, Dorset, September, 1901, *E. H. Terry*. NEW YORK: southeast face of Wallface Mt., above southern end of Indian Pass, at 3200 ft. alt., Essex Co., *House*, no. 9436; rocky banks of lakes in St. Lawrence and Jefferson Counties, 1833 and 1834, *Asa Gray* (type of *D. incana*, var. *glabriuscula*); on rocks, Trenton Falls, June, —, no. 72 (herb. Torrey); Sackett's Harbor, *W. A. Wood*; Burdick's Glen, Lansing, June 16, 1885, *Dudley*; dry rocks, small ravine north of Esty's Glen, Lansing, *A. J. Eames*, no. 12,081; near Akron, Erie Co., 1864, *Clinton*. ONTARIO: sand-dunes, Picton, June 26, 1886, *Fowler*; plentiful on Lake Muskoka, June, 1916, *N. Tripp* (Herb. Univ. Mich.); North Shore, Lake Superior (between Sault Ste. Marie and Michipicoten), *Loring*; Jack Fish, June 26, 1898, *J. Fletcher*; very abundant on cliffs and gravel, Jack Fish, *Pease*, no. 23,487; dry cliffs, Northern Slate Island, Thunder Bay Distr., *Pease*, no. 23,633; Mt. McKay, September 7, 1889, *Britton & Timmerman*; Lake Nipigon, July 8, 1884, *J. Macoun*. MICHIGAN: Fort Gratiot, *Dr. Z. Pitcher* (type of *D. arabisans*  $\beta$ . Torr. & Gray and of *D. Longii*), in herb. Torrey; bluffs and ledges, Mackinac Island, July 2, 1897, *E. T. & S. A. Harper*, and numerous later collectors; limestone rocks, Prentis Bay, Mackinac Co., *Ehlers*, nos. 1103, 1352, *C. & E. Erlanson*, no. 648; Isle Royale, 1868, *G. A. Marr*, *A. E. Foote*, also *W. S. Cooper*, no. 40, in part (partly var. *canadensis*); base of Monument Rock, Isle Royale, *McFarlin*, no. 2174; island in Rock Harbor, Isle Royale, *McFarlin*, no. 2246; rock-crevices, Passage Island, August 25, 1930, *Povah & Brown*; wind-swept sandstone-conglomerate crest of Lookout Mt., Keweenaw Co., *Fernald & Pease*, no. 3316.<sup>1</sup> WISCONSIN: bluffs on Point Washington, Door Co., June 21, 1891, *Schuette*. MINNESOTA: Grand Portage,  $\frac{1}{2}$  mile southeast of the village, *Rydberg*, no. 9666; talus below calcareous cliff, Grand Portage, *Butters & Buell*, no. 367. PLATE 314 and 315, FIGS. 1, 2 and 5; MAP 21.

Var. CANADENSIS (Brunet) Fern. & Knowlt. RHODORA, vii. 67, t. 60, fig. 12 (1905). *D. canadensis* Brunet, Cat. Pl. Can. 21 (1865); O. E. Schulz, l. c. 277 (1927), excluding var. *pycnosperma*.—Low, 0.7–1.5 dm. high; siliques elliptic-ovate, 3–8 mm. long, 2–4 mm. broad.—Scattered locally through the range, perhaps better treated as a form. NEWFOUNDLAND: limestone cliffs and talus, Tucker's Head, Bonne Bay, *Fernald, Long & Fogg*, no. 1749. QUEBEC: rocher, Bic, *Rousseau*, no. 26,322 (as var. *orthocarpa*); crevices of rocks, St. Joachim, Cap Tourmente, 1864, *Ovide Brunet* (TYPE collection), *Rolland*, no. 15,640. MICHIGAN: Isle Royale, *Cooper*, no. 40, in part (mixed with typical *D. arabisans*); wind-swept sandstone-conglomerate crest of Lookout Mt., Keweenaw Co., *Fernald & Pease*, no. 3317, clearly an extreme of the plant with lanceolate siliques. PLATE 315, FIGS. 3, 4 and 6.

<sup>1</sup> This station, discovered since MAP 21 was engraved, should be indicated by a dot near Keweenaw Point.



*Draba arabisans* is one of the clearest-cut perennial species of temperate eastern America, and its confusion with others has arisen through inadequate understanding of it or reliance upon mere outlines of siliques rather than upon its more significant characters (sufficiently emphasized in the key and the description above). The torsion of the silique (PLATE 314, FIGS. 2, 3 and 4), which is frequent or usual, may be quite lacking (PLATE 314, FIGS. 1 and 5 and PLATE 315) and similar torsion occurs in many other species. *D. arabisans*, var. *orthocarpa*, as already explained, in the discussion of *D. glabella*, as originally conceived was a mixture, the type-collection (PLATE 309) belonging with *D. glabella*. The remnant left in *D. arabisans* is not worthy special recognition, being merely plants with the siliques little or not at all twisted, a very inconstant character.

Var. *canadensis* (PLATE 315, FIGS. 3, 4 and 6) is, presumably, not a very significant extreme. It seems to be a minor variety with siliques of shorter and broader outline than usual. Its retention as a species by Schulz has been discussed, under *D. pycnosperma*; Schulz very evidently not understanding *D. canadensis* but giving under it a very full and accurate account of the wholly distinct plump-fruited *D. pycnosperma* (PLATE 306). In view of the great range of shape and size of the siliques (PLATES 314, 315), from narrowly lanceolate to elliptic or ovate and either twisted or plane, Schulz's description of them (his p. 275) as "lineari-lanceolatae" is peculiarly inadequate.

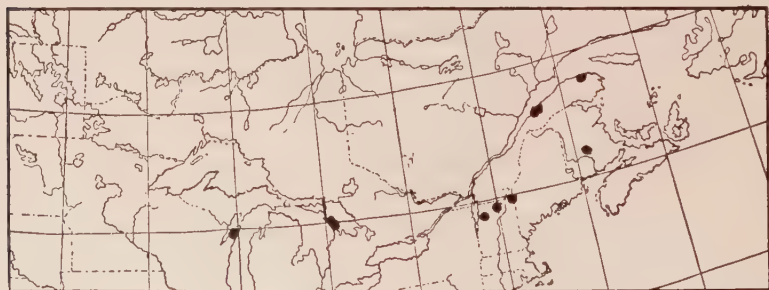
Although the characterization of *Draba arabisans* in *Das Pflanzenreich* assigns the species "Semina minora, vix 1 mm longa," I am unable, in the many hundreds of fruiting specimens now before me, to find well-developed seeds as short as 1 mm.; all good seeds are at least 1.1 mm. long and they range up to a length of 1.7 mm. In fact, flat-fruited *D. arabisans* can quickly be distinguished from *D. glabella* and its var. *orthocarpa*, with which it has been confused, by the seeds alone: in *D. arabisans* 1.1–1.7 mm. long, in *D. glabella* and var. *orthocarpa* 0.7–1 mm. long.

For discussion of Mrs. Ekmans quite untenable opinion that *D. arabisans* is a hybrid of *D. aurea* and *D. glabella* (*D. daurica*) see p. 251.

*Ehlers*, no. 1103, from limestone rocks, Prentiss Bay, Mackinac Co. (Herb. Univ. Mich.), in mature fruit was recorded as *D. aurea* by Walpole, Proc. Mich. Acad. Sci. vi. 313 (1926).

18. *D. LANCEOLATA* Royle. *Perennial*, with simple to multicapital caudices, forming tufts or mats 0.2–1.5 dm. across; the caudex or its branches retaining many marcescent leaves or their shreds: *rosettes*

1.5–8 cm. across; *their leaves crowded, oblanceolate or spatulate, entire or remotely dentate, 0.7–4 cm. long, 1–8 mm. broad, cinereous with dense and soft stellate tomentum*: flowering stems 1–30, simple or branching, 0.5–3.5 dm high, *stellate-tomentulose* and very short-pilose: cauline leaves 2–10, lanceolate, oblong or narrowly ovate, entire, denticulate or coarsely dentate, somewhat stellate-tomentulose and often short-pilose, 0.5–3 cm. long: *racemes dense to lax, often leafy-bracted at base, in maturity elongating to  $\frac{1}{3}$ – $\frac{4}{5}$  the full height of the plant*: pedicels strongly ascending in fruit: sepals narrowly oblong, pilose, 2–3 mm. long: petals white, obovate, emarginate, 3–5 mm. long: ovary stellate-pilose: *siliques linear-lanceolate to ellipsoid-ovoid, plump, with convex valves, 4–14 mm. long, 1.5–2.5 mm. broad, densely stellate-pannose, twisted or plane; the style very short (up to 0.75 mm. long)*: seeds 20–48, 0.7–1 mm. long.—*Illustr. Bot. Himal. Mts. i.* 72 (1839); O. E. Schulz in Engler, *Pflanzenr.* iv<sup>105</sup>. 296 (1927). *D. incana* Reichenb. *Ic. Pl. Crit.* viii. 28, t. 769, fig. 1031 (1830); Gray, *Man.* ed. 5: 71 (1867), in large part; not L. *D. confusa* of many Asiatic authors, not Ehrh. *D. stylaris* Fern. & Knowlt. *RHODORA*, vii. 64, t. 60, figs. 3–5 (1905) and later Amer. authors; N. Busch, *Fl. Sib.* iii. 375 (1919); Pohle in Fedde, *Repert. Beih.* xxxii. 52 (1925); not J. Gay (1818), acc. to Schulz. *D. cana* Rydb. *Bull. Torr. Cl.* xxix. 241 (1902); O. E. Schulz, l. c. 298 (1927). *D. valida* Goodding, *Bot. Gaz.* xxxvii. 55 (1904); O. E. Schulz, l. c. 294 (1927).—Northern and alpine regions of Asia and North America; in America from eastern Quebec to Yukon, locally south to New Brunswick, northern New



MAP 22. Eastern American Range of *DRABA LANCEOLATA*.

Hampshire, northern Vermont, Ontario, Michigan, Wisconsin, Colorado and Utah. The following are the eastern American specimens seen. QUEBEC: lower dry calcareous slaty talus of Mt. St. Pierre, Gaspé Co., *Fernald, Weatherby & Stebbins*, no. 2446; cold and shaded limestone-conglomerate ridge from Pointe aux Corbeaux to Cap Caribou, Bic, *Fernald & Collins*, no. 1077; crevices of dry calcareous rock, Cap Enragé, Bic, *Collins & Fernald*, no. 90; sur le conglomerat nu, au nord du Cap Enragé, Bic, *Rousseau*, no. 26,585; talus of limestone-



conglomerate sea-cliffs, alt. 200–275 m., east of St. Fabien, *Fernald & Collins*, no. 1078 (lax state); exposed crests of limestone sea-cliffs, east of St. Fabien, *Fernald & Collins*, no. 1079. NEW BRUNSWICK: dry rocks, Nashwaak, 1881, *J. Moser* in herb. N. B. Nat. Hist. Soc. NEW HAMPSHIRE: dry cliff, Diamond Peaks, Dartmouth College Grant, *Pease*, no. 20,614. VERMONT: dry cliffs, Willoughby, *Horace Mann, Edw. Tuckerman* and many others; dry alpine cliffs, Smuggler's Notch, Mt. Mansfield, August 2, 1893, *Eggleston*. ONTARIO: limestone boulders, foot of cliffs, Smoky Head, north of Lion's Head, Bruce Co., *Stebbins et al.*, no. 143; limestone ledges near shore of Georgian Bay, north of Dyer's Bay, Bruce Co., *Stebbins et al.* no. 144. MICHIGAN: crevices and talus of limestone cliff, Burnt Bluff, Delta Co., *Fernald & Pease*, no. 3318.<sup>1</sup> WISCONSIN: summit of cliff, Fish Creek, Door Co., *Fassett*, no. 15,566 (lax state). Mostly distributed as *D. incana* or *D. stylaris*. Previously cited specimens from Labrador and Newfoundland were erroneously identified. PLATES 316, 317, 318; MAP 22.

*Draba stylaris* J. Gay, to which our plant was referred by Knowlton and me when we pointed out its differentiation from the chiefly annual and biennial long-pilose *D. incana*, is, according to Schulz, one of the variants of *D. incana*, confined to continental Europe and the Caucasus. That being admitted it is necessary to seek the next available name for the perennial, matted, canescent plant of Asia and North America.

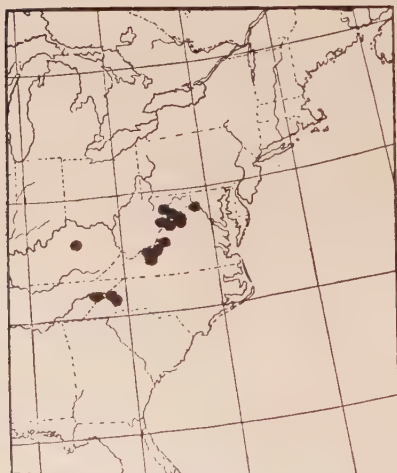
Although Schulz keeps apart as species *D. lanceolata* Royle (1839) (PLATES 317, FIGS. 1 and 2, and 318, FIG. 2) as strictly Asiatic, and *D. cana* Rydberg (1902) (PLATES 316, 317, FIGS. 3 and 4, and 318, FIG. 1) and *D. valida* Goodding (1904) (PLATE 317, FIG. 5) as strictly North American, I can get no satisfactory distinctions between them. They all show, furthermore, the well known arctic-alpine dispersal on the two continents and it is significant that, although Schulz maintains both *D. cana* (TYPE shown in PLATE 318, FIG. 1) and *D. valida* (TYPE shown in PLATE 317, FIG. 5) as species, Rydberg, who was not averse to maintaining weak species, has regularly united them in his later work. It is also significant that Schulz's description of *D. cana* consists merely of a comparison of it with *D. lanceolata*. The few differences pointed out by him, slight divergences in size of leaves and siliques, do not hold either in the Asiatic specimens before me nor in the larger American series (see PLATES 316–318).

DRABA CINEREA Adams, Mem. Soc. Nat. Mosc. v. 103 (1817) (*D.*

<sup>1</sup>The Michigan station should be added to MAP 22, on the peninsula 1 mm. (on the map) northeast of the Wisconsin station.

*arctica* J. Vahl, Fl. Dan. xiii. fasc. xxxix. 5, t. 2294 (1840)), has been found on the western side of Hudson Bay, as far south as Cape Henrietta Maria. It is likely to be found on the Labrador Peninsula. From *D. lanceolata* it differs in its few (1-4) remote cauline leaves, its fruiting racemes barely half the height of the plant and borne far above the upper leaf, and the seeds fewer (at most 36).

19. *D. RAMOSISSIMA* Desv. *Perennial*, forming broad mats (up to 2 or 3 dm. broad); the elongate humifuse branches and branchlets of the caudex covered below with marcescent shreds of old leaves and ending in rosettes 2-10 cm. across: *rosette-leaves* membranaceous, cuneate-oblancoate, 1-5 cm. long, 2-15 mm. broad, minutely pilose, with 1-5 pairs of frequently horizontally divergent narrow teeth (sometimes with secondary teeth), or merely low-serrate: *flowering*



MAP 23. Range of *DRABA RAMOSISSIMA*.

*stems* 0.7-4.5 dm. high, divergently branched above, forming corymbosely paniculate inflorescences, pubescent with short branching, substellate and simple trichomes intermixed, leafy: cauline leaves 2-24 (rarely almost wanting), lanceolate, oblong, elliptic or ovate, acute, coarsely serrate to deeply pectinate, 0.5-4.5 cm. long, 0.1-2.2 cm. broad: *racemes* corymbosely paniculate, becoming very loose: pedicels filiform, elongate: sepals oblong or narrowly ovate, 2-3.3 mm. long: *petals* white or whitish, narrowly obovate or broadly spatulate, 5-7 mm. long: anthers about 0.5 mm. long: ovary pubescent: *siliques* long-pedicelled,

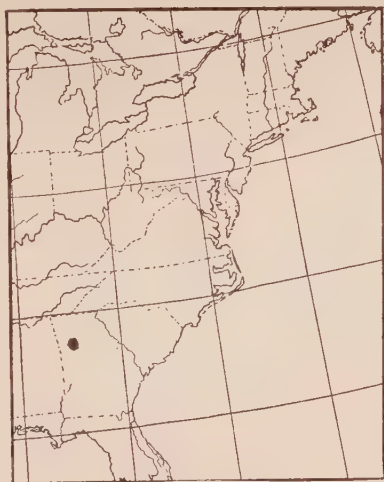
linear-lanceolate to elliptic-oblong, usually spirally twisted, stellate-pubescent, 3-11 mm. long, with filiform style 1.5-3 mm. long: *seeds* 7-15, 1.2-1.8 mm. long.—Journ. de Bot. iii. 186 (1814); DC. Syst. ii. 355 (1821) and Prodr. i. 171 (1824); Torr. & Gray, Fl. N. Am. i. 106 (1838); Watson in Gray, Syn. Fl. N. Am. i. 111 (1895); Britton in Britt. & Brown. Ill. Fl. ii. 142, fig. 1761 (1897); O. E. Schulz in Engler, Pflanzenr. iv<sup>105</sup>. 187 (1927). *D. arabisans* Pursh, Fl. Am. Sept. ii. 434 (1814), as to Virginia plant, not Michx. *Alyssum dentatum* Nutt. Gen. N. Am. Pl. ii. 63 (1818). *D. dentata* (Nutt.) Hook. & Arn. in Hook. Journ. Bot. i. 192 (1834); Hook. Icon. Pl. i. t. xxxi. (1837).—Cliffs and rocks, Virginia, West Virginia, Kentucky, Tennes-



see and North Carolina, highly variable in size and toothing of leaves. The species is so very distinct and of such isolated range (as compared with the other and more northern perennial species) that it is unnecessary to cite the numerous specimens. Those examined come from the following counties. VIRGINIA: Page, Shenandoah, Rockingham, Rockbridge, Roanoke, Giles and Pulaski Cos. WEST VIRGINIA: Jefferson, Hardy, Grant and Pendleton Cos. KENTUCKY: Fayette Co. (and doubtless elsewhere). TENNESSEE: Cocke Co. NORTH CAROLINA: Madison and Buncombe Cos. Well illustrated, as *D. dentata* (Nutt.) Hook. & Arn. in Hook. Icon. Pl. i. t. xxxi (1837). MAP 23.

*Draba ramosissima* is one of the most distinct species of eastern North America. Although varying greatly in stature, size and depth of toothing of leaves and length of siliques it stands well apart from other American species. Schulz places it, along with *D. aurea*, *D. aureola* and other species with orange or yellow petals in his section *Phyllodraba* and includes it in his key under the call: "I. Flores flavi" (pp. 173, 174), though in the fuller description (p. 187) he slightly reduces the shock by saying "Petala dilute flava." The petals, according to those who have collected the plant, are the white of those of *D. arabisans*, *D. incana*, *D. glabella* and the others of Schulz's section *Leucodraba* ("Flowers white"—Torr. & Gray, Fl. No. Am. i. 106; "flowers white"—Gray, Man. ed. 2: 36; "flowers white"—Britton in Britt. & Brown, Ill. Fl. ii. 142; "petals white"—Small, Fl. Se. U. S. 480). So white are the petals that when Pursh (Fl. Am. Sept. 434) "collected specimens on the rocks near Harper's Ferry" (very possibly the type-station of *D. ramosissima*) he mistook it for the white-flowered *D. arabisans* Michx.

20. *D. APRICA* Beadle. *Annual* or winter-annual: stems 0.5–3.5 dm. high, simple below or loosely branched and stellate-puberulent; rarely with elongate branches above, but with abbreviated or sessile short corymbs in the middle and upper axils: lower leaves obovate to rhombic-oval, coarsely



MAP 24. Range of *DRABA APRICA*.

2-4-dentate, thin, petioled, 0.7-2 cm. long, minutely strigose-hirtellous with irregularly stellate trichomes; cauline leaves remote, up to 17 in number, sessile, narrowly obovate to narrowly oblong or the upper linear-lanceolate, 0.5-2 cm. long, entire or sparsely dentate: flowers apparently hermaphrodite, some apetalous, others petaliferous: pedicels stellate-puberulent: sepals narrowly oblong, 0.8-1 mm. long: petals, when present, white, spatulate, 2.5-3 mm. long (acc. to Beadle): siliques linear-ellipsoid, 4-6 mm. long, minutely stellate-puberulent, tipped by a minute slender style: seeds 6, oblong-oval, 1-1.5 mm. long.—Beadle in Small, Fl. Se. U. S. ed. 2, Append. 1336 (1913); O. E. Schulz in Engler, Pflanzenr. iv<sup>105</sup>, 339 (1927).—GEORGIA: "common" on Kenesaw Mt., near Marietta, May 9, 1901, Biltmore Herb. (TYPE, Herb. N. Y. Bot. Gard.); dry, open northern and northeastern slope, near the top, Kenesaw Mt., May 5 and 12, 1934, L. M. Perry & M. C. Myers, nos. 750, 751. PLATE 319, FIGS. 8-10; MAP 24.

*Draba aprica* is little known. Until its rediscovery by Dr. Perry and Mr. Myers in the spring of 1934, the only material I had seen was the type sheet, which contains three fruiting specimens, two of them with the stems simple except for the abbreviated upper branches (FIG. 8), the third a taller plant which might well have been 3.5 dm. high (the terminal raceme broken off) and bearing a few elongating axillary racemes, apparently a response to the breaking off of the top. The original label states that it is "common"; but Dr. Perry's experience indicates that, in 1934 at least, it is not abundant. I quote from her letter of May 28, 1934.

On May 5th I took the train [from Athens, Georgia] for Marietta, was joined by Mr. Myers, a former student of mine, and we proceeded to Mount Kenesaw. It is a rugged and rough hill in two parts. We were able to cover but one part that day between trains, and I must own that I was somewhat discouraged. We were almost to the top of the northeast slope before Mr. Myers, who was some ten feet ahead of me, stopped and said, "here it is, Dr. Perry," and handed me a specimen. We had been made so confident by the "common" on the label which you described that I couldn't understand what was the matter with my eyes. There were ten to fifteen plants in that spot. We found one other spot and that is all. The mountain is pretty open on top but I believe it had been burned over either early this spring or very late last fall. Anyhow, a job half done isn't done at all, and to convince you that I was painstaking about it, on my own I hired a car the next Saturday and that day we covered the other part of the mountain, somewhat more leisurely as we had no train to make. In all we probably found 50 good specimens, so I can assure you that the little *Draba* is very rare, this season at any rate.

Dr. Perry further informs me that *Draba aprica* is closely associated with *Viola Rafinesquii* Greene and *Oxalis violacea* L.

Schulz suggested that *Draba aprica* is to be compared with *D.*







DRABA ARABISANS: FIG. 1, portion of flowering branch,  $\times 1$ , from Ontario; FIG. 2, fruiting branch,  $\times 1$ , from type region, Lake Champlain, Vermont; FIG. 3, fruiting branch,  $\times 1$ , from Quebec; FIG. 4, fruiting raceme,  $\times 1$ , from type region, Lake Champlain; FIG. 5, silique,  $\times 10$ , from type region; FIG. 6, small rosette-leaf,  $\times 10$ , from Newfoundland.



DRABA ARABISANS: FIG. 1, portion of fruiting branch,  $\times 1$ , of short-fruited plant (isotype of *D. megasperma*, var. *leiocarpa* O. E. Schulz) from Bic, Quebec; FIG. 2, short fruiting raceme,  $\times 1$ , from Percé, Quebec; FIG. 4, small plant,  $\times 1$ , approaching var. CANADENSIS, from Newfoundland; FIG. 5, silique,  $\times 10$ , from FIG. 1.  
DRABA ARABISANS, var. CANADENSIS: FIG. 3, fruiting raceme,  $\times 1$ , of isotype, from Cape Tourmente, Quebec; FIG. 6, silique,  $\times 10$ , from FIG. 3.





DRABA LANCEOLATA: FIG. 1, portion of slender fruiting plant,  $\times 1$ , from Quebec; FIG. 2, portion of slender fruiting plant,  $\times 1$ , from Ontario; FIG. 3, center of rosette,  $\times 10$ , from Quebec; FIG. 4, portion of internode,  $\times 10$ , from Quebec; FIG. 5, silique,  $\times 10$ , from Vermont.



DRABA LANCEOLATA: FIG. 1, flowering plant,  $\times 1$ , from Ajan, Siberia; FIG. 2, fruiting plant,  $\times 1$ , from Songaria; FIG. 3, flowering stem,  $\times 1$ , from Vermont; FIG. 4, fruiting plant,  $\times 1$ , from Quebec; FIG. 5, fruiting plant,  $\times 1$ , from Utah (isotype of *D. valida* Goodding).



DRABA LANCEOLATA: FIG. 1, low branching plant (type of *D. cana* Rydb.),  $\times 1$ , from Alberta; FIG. 2, flowering plant,  $\times 1$ , from eastern Siberia.





*DRABA BRACHYCARPA*: FIG. 1, fruiting plant,  $\times 1$ , from Indiana; FIG. 2, small-flowered plant,  $\times 1$ , from Tennessee; FIG. 3, large-flowered plant,  $\times 1$ , from Virginia; FIG. 4, large-flowered plant,  $\times 1$ , from Missouri; FIG. 5, fruiting plant,  $\times 1$ , from Tennessee; FIG. 6, silique,  $\times 10$ , from FIG. 5; FIG. 7, septum and seeds,  $\times 10$ , from FIG. 5.

*DRABA BRACHYCARPA*, var. *FASTIGIATA*: FIG. 11, TYPE,  $\times 1$ ; FIG. 12, siliques,  $\times 10$ , of TYPE.

*DRABA APRICA*: FIG. 8, TYPE,  $\times 1$ ; FIGS. 9 and 10, silique and septum with seed,  $\times 10$ , from TYPE.



*brachycarpa* Nutt., var. *fastigiata* Nutt. in Torr. & Gray, Fl. N. Am. i. 108 (1838) and he published the needless binomial "Nuttall 1825 als *Draba fastigiata* msc. in hb. Delessert!"—Schulz, l. c. 339 (1927). *D. brachycarpa*, var. *fastigiata* was separated from typical *D. brachycarpa* as "more pubescent; stem mostly simple; radical leaves mostly 4-toothed; silicles pubescent."

Whether *Draba aprica* should include *D. brachycarpa* var. *fastigiata* is at present not wholly clear. The type sheet of *D. brachycarpa* from the Torrey Herbarium is before me. It consists of the original Nuttall material from Arkansas, four plants at the top of the sheet; and at the bottom the plants from Millidgeville, Georgia, Boykin and from Macon, Georgia, Loomis, originally cited for *D. brachycarpa*, and a third and different specimen without designation of locality but presumably from near St. Louis, Missouri, the fourth locality given by Torrey & Gray. The four specimens of the original Nuttall collection from Arkansas are two branching plants which must stand as the type of Nuttall's species and which are thoroughly typical of that species as understood. Alternating with them on the sheet are two unbranched individuals, one with the raceme gone, the other (FIG. 11) with a compact terminal raceme of a few stellate-pubescent oblanceolate siliques (FIG. 12). The two simple specimens are marked in Nuttall's hand *D. fastigiata* and must stand as the type of *D. brachycarpa*, var. *fastigiata*. In view of the fact that the larger specimen of the two has lost its raceme, I refrain from opening one of the immature siliques of the remaining individual. The seeds of this plant, if mature, would quickly settle whether it is a very unusual variation of *D. brachycarpa* (PLATE 319, FIGS. 1-7), which otherwise has oblong and glabrous siliques, or a very dwarf and atypical representative of the highly localized *D. aprica*. The collections in the Gray Herbarium and at the New York Botanical Garden show no *D. brachycarpa* with pubescent siliques; and, in view of the presence on Nuttall's sheet of specimens of typical *D. brachycarpa* from two Georgia stations, it is not impossible that the two plants of var. *fastigiata* came, not from Arkansas, as supposed, but from Kenesaw Mt. in Georgia, which is easily reached from Atlanta. Students of the Arkansas flora should watch for and, if possible, collect material to settle this dilemma.

21. *D. BRACHYCARPA* Nutt. Annual or biennial (forming rosettes the first year): stems simple or more commonly bushy-branched either from the base or from the upper axils, stellate-hirtellous or -strigose,



0.4–2 dm. high: basal leaves elliptic, oval or obovate, petioled, 0.5–2 cm. long, stellate-pubescent; cauline leaves 3–12, smaller and narrower, sessile, the upper nearly linear: *racemes* at first dense, *in fruit becoming lax* and up to 7.5 cm. long: pedicels spreading-ascending, glabrous to stellate-hirtellous, the lower becoming 1–5 mm. long: *flowers dimorphic or trimorphic*,<sup>1</sup> the smaller apetalous, others with small narrow petals, others with conspicuous white petals: sepals oblong to ovate (in larger flowers), 1–1.5 mm. long, glabrous or sparsely pilose: *larger petals obovate*, 2–3 mm. long: *pistils glabrous*, with 10–16 ovules: *siliques oblong-ellipsoid*, 1.7–5 mm. long, glabrous: *seeds* 0.5–0.8 mm. long.—Nutt. in Torr. & Gray, Fl. N. Am. i. 108 (1838); Darby, Man. Bot. ii. 24 (1841); Gray, Man. ed. 2: 37 (1856); Chapm. Fl. So. U. S. 29 (1860); Watson in Gray, Syn. Fl. N. Am. i.<sup>1</sup> 107 (1895); Britton in Britton & Brown, Ill. Fl. ii. 143, fig. 1762 (1897); Small, Fl. Se. U. S. 480 (1913); O. E. Schulz in Engler, Pflanzenr. iv.<sup>105</sup> 338, fig. 32 (1927). ?*Discovium gracile* Raf. Journ. de Phys. lxxxix. 96 (1819). ?*Discovium Ohiotense* DC. Syst. ii. 700 (1821). *Alyssum bidentatum* Nutt. ex Torr. & Gray, l. c. (1838) as syn. *Abdra brachycarpa* (Nutt.) Greene,

<sup>1</sup> "This humble white flower is at this season very abundant on the grassy hills about town, associated with *Draba Caroliniana*, the pretty *Houstonia minima*, with *Androsace occidentalis*, *Plantago pusilla*, *Ranunculus fascicularis*, *Myosurus minimus*, and the completely naturalized *Capsella*. In ordinary or in wet springs the flowers are all regularly formed and comparatively large, having a diameter of about 2 lines; in very dry springs, however, such as the present one, a form with very inconspicuous flowers becomes common, which in isolated specimens in the herbarium might be taken for a distinct species, but, studied on its native hills in thousands of specimens, clearly proves to be nothing but a depauperate or abortive state and not even a clearly defined variety.

During a late excursion to our commons in company with Dr. Hilgard, he ascertained that on the northern slopes of hills and sinkholes, and near the edge of ponds, the plant had the ordinary appearance, but on the sunny and dry or even arid southern slopes not a single one among the thousands of specimens could be found the flowers of which were not quite inconspicuous; in intermediate situations the size and organization of the flowers were also intermediate.

These incomplete flowers are smaller in all their parts than the regular ones; the sepals are erect and rather persistent; the petals always shorter than the sepals, but variable in size, shape, and number, or even entirely absent; the stamens always abortive and often reduced in number; the ovary shorter but fertile.

The petals ordinarily broadly obovate-spatulate, retuse, over 1 line long, are here linear-spatulate, entire, emarginate or bilobed, 1/6–1/3 line long, 2 or 4 in a flower, often of unequal size in the same flower, or entirely absent. The slender filaments bear a bilobed cellular head, often not more than 0.05 line long, representing the anther, but without any regular structure. He found in single flowers 4, and often 5 or 6 of them, without petals, or associated with 2 or 4 rudimentary petals. It appears that in some incomplete tetrandrous flowers the pairs of stamens adhere to the base of the corresponding exterior, and the pairs of petals to that of the interior sepals; the 8 organs forming rather one than two cycles.

How these female plants, as they must be called, which, this spring at least, form the immeasurably largest part of the whole crop, can be fertilized by the few complete ones growing in the neighborhood, is not easy to understand.

Does not this dimorphism obtain in other species of this genus, in *Lepidium* and other *Cruciferae*, and would not several so-called species fall, if correctly understood, under other fully developed ones as incomplete forms?"—Engelm. Trans. Acad. Sci. St. Louis, ii. 154 (1862).

Pittonia, iv. 207 (1900). *D. brachyc.*, vars. *apetala* and *grandiflora* Engelm. ex O. E. Schulz, l. c. 339 (1927) as syns. *D. bidentata* Nutt. ex O. E. Schulz, l. c. 339 (1927) as syn.—Dry to moist open soil and waste ground, northern Florida to Texas, north to Virginia, southern Ohio (?), Indiana, Illinois, Missouri and Kansas; also (adventive?) in Oregon. Flowers late winter and early spring. PLATE 319, FIGS. 1-7.

For discussion of the problematical *Draba brachycarpa*, var. *fastigiata* see notes under *D. aprica*.

*Draba brachycarpa* is inclined to be a weed of roadsides and waste places and its present northern limits have doubtless been extended beyond its primitive range.

There are two names earlier than *Draba brachycarpa* (1838) which need explanation. Here possibly belongs *Discovium gracile* Raf. (1819), "Trouvé en juin sur les rives de l'Ohio, près de Gallipolis." Rafinesque's description, save for "Fleurs jaune" (an error independently committed by some later authors) and for the month June, which is rather late, strongly suggests that he had *Draba brachycarpa*, although I know of no evidence of the species now being found in Ohio (it is in Tennessee, Indiana and Illinois). I have seen none of Rafinesque's material but it is apparently preserved in the DeCandolle herbarium at Geneva. Should it prove, as I surmise, to be *Draba brachycarpa*, *Discovium gracile* (1819) cannot displace the name *Draba brachycarpa* (1838) because of *Draba gracilis* Graham (1828). A complicating situation arises through the fact that DeCandolle in 1821 called Rafinesque's species *Discovium Ohiotense*, without citing *Discov. gracile* as a synonym. Consequently, it might plausibly be urged that De Candolle's specific epithet should be used (when and if the species proves to be *Draba brachycarpa*). It should be noted, however, that DeCandolle exactly translated Rafinesque's French diagnosis of *Discov. gracile* into Latin and added nothing to it, even citing the identical habitat: "Ad ripas fluminis Ohio prope Gallipoli." It should be evident, therefore, that, although he did not mention *Discov. gracile* Raf. as the basis of his *Discov. Ohiotense*, DeCandolle was, in fact, publishing a needless new name for it. As an illegitimate name, *Discov. Ohiotense* cannot be taken up to displace the legitimate *Draba brachycarpa*, even though it antedates it by seventeen years.

22. *D. NEMOROSA* L. Annual or winter-annual 0.5-3 dm. high, simple or with few ascending branches: stem hispid with simple, bifurcate and stellate trichomes variously intermixed: rosette-leaves

oblong-obovate or elliptical, obtuse, with pubescence as on the stem, subentire or remotely dentate: cauline leaves 0-7 on the primary axis, 1-5 on the branches, oblong to ovate, acute, with 2-6 pairs of teeth: raceme corymbiform in anthesis, becoming elongate and very lax and up to nearly the full height of the plant: sepals 1.5 mm. long, oblong or narrowly ovate, obtuse: petals pale yellow, becoming white, narrowly cuneate, about 2 mm. long: fruiting pedicels widely spreading to subascending, often arching, filiform, 0.7-2(-2.5) cm. long: siliques narrowly oblong, 3-13 mm. long, minutely strigulose-hispid: seeds 30-50.—Sp. Pl. 643 (1753); Gray, Man. ed. 2: 37 (1856); Wats. in Gray, Syn. Fl. N. Am. i. 107 (1895); Britton in Britt. & Brown, Ill. Fl. ii. 143, fig. 1763 (1897); O. E. Schulz in Engler, Pflanzenr. iv.<sup>105</sup>. 309 (1927), which see for detailed citations; Rydb. Fl. Prair. Pl. Centr. N. Am. 379, fig. 252 (1932). *D. muralis*,  $\beta$ . L. Fl. Suec. ed. 2: 224 (1755). *D. nemoralis* Ehrh. Beitr. vii. 154 (1792); Hook. Fl. Bor.-Am. i. 55 (1830); Torr. & Gr. Fl. N. Am. i. 108 (1838); Gray, Man. 39, (1848). *D. nemorosa*,  $\beta$ . *hebecarpa* Lindbl. Linnaea, xiii. 333 (1839). *D. nemoralis*,  $\alpha$ . *genuina* Boiss. Fl. Orient. i. 303 (1867). *D. nemorosa*,  $\alpha$ . *typica* Beck von Man. Fl. Nied.-Öst. 472 (1892). *D. nemoralis*, var. *hebecarpa* (Lindbl.) Lehm. Fl. Poln.-Liv. 315 (1895). *Crucifera nemorosa* (L.) E.H.K. Krause in Sturm, Fl. Deutschl. ed. 2, vi. 61 (1902). *D. nemorosa*, var. *genuina* N. Busch in Kusnezow, Busch & Fomin, Fl. Cauc. Crit. iii<sup>4</sup>. 406 (1909), ascribed to Boiss. l. c.—Dry open soils through much of western North America, from northern British Columbia to Nevada and Utah, east to Manitoba and South Dakota, very locally to western Ontario and Michigan; Eurasia.

The plants with siliques only 3-6 mm. long have been called

Forma BREVISILIQUA (Zapalowicz) N. Busch, Fl. Sib. iii. 389 (1919). Var. *brevisiliqua* Zapalowicz, Consp. Fl. Galic. Crit. xxv. in Rozpr. Wydz. Mathem.—Przyr. Akad. Umiej. ser. 3, xiiB, 238 (1912), acc. to Schulz, l. c. 313.

The plants with large siliques (9-13 mm. long, 2-2.5 mm. broad) have been called

Forma MACROLOBA Pohle in Fedde, Repert. Beih. xxxii. 3 (1925).

Var. LEJOCARPA Lindbl.—*Siliques* glabrous.—*D. lutea* Gilib. Fl. Lith. ii. 46 (1781); DC. Syst. ii. 351 (1821) and Prodr. i. 171 (1824); Hook. Fl. Bor.-Am. i. 55 (1830); Rydb. Fl. Rky. Mts. 352 (1917) and later works. *D. muralis*,  $\beta$ . *Draba intermedia* H. de Martius, Fl. Mosq. 111. (1812). *D. gracilis* Graham, Edinb. New Phil. Journ. iv-ix. 172 (1828). *D. nemorosa*,  $\alpha$ . *lejocarpa* Lindbl. Linnaea, xiii. 333 (1839); O. E. Schulz, l. c. 314 (1927), which see for much further bibliography. *D. nemoralis*,  $\beta$ . *glabra* Fleischer & Lindem. Fl. Esth.-Liv.-u. Kurland, 230 (1839). *D. nemorosa*, var. *lutea* (Gilib.) Fries, Summ. Veg. Scand. i. 31 (1846). *D. nemorosa*,  $\alpha$ . *glabra* (Fleisch. & Lindem.) Schur, Enum. Pl. Transsilv. 66 (1866). *D. nemoralis*,  $\beta$ . *lejocarpa* (Lindbl.) Boiss. Fl. Orient. i. 303 (1867). *D. dictyota*



Greene, *Pittonia*, iv. 313 (1901).—Alaska to Colorado, eastward to Hudson Bay (Churchill, *J. M. Macoun*, no. 79,070) and Lake Superior,<sup>1</sup> Ontario and Minnesota; locally introduced eastward to QUEBEC: "Apparement naturalisé de l'Ouest," Lac Deschenes, 26 mai 1923, Herb. Univ. Montr. no. 17,416. Eurasia.

23. *D. CUNEIFOLIA* Nutt. Annual or winter annual (forming rosettes the first year, flowering and fruiting in earliest spring): stem simple or branching from near the base, in anthesis 0.2–1.5 dm. high, in fruit elongating to 0.5–2.8 dm. high, hispid from base to summit with simple, bifurcate and minute stellate hairs; leaves basal and at the lower nodes and at bases of the arched-ascending branches, cuneate-obovate, obtuse, mostly 1–3 cm. long, coarsely dentate, hispid with stipitate and sessile forking trichomes: raceme in anthesis corymbiform, elongating in fruit to a lax raceme  $\frac{1}{3}$ – $\frac{1}{2}$  the height of the plant: flowers dimorphic or trimorphic, those of the primary raceme large and showy, of the lateral ones either large or with minute petals or apetalous, or all of them minute;<sup>2</sup> sepals of the larger flowers 1.8–2.5 mm. long, oblong, obtuse, the outer hispid; of the small flowers 1–1.6 mm. long, hispid; larger petals white, elliptic to broadly spatulate, 3–5 mm. long; anthers of the larger flowers 0.2–0.4 mm. long, of the smallest minute or wanting: fruiting pedicels pubescent, horizontally divergent or upwardly arching, 3–8 mm. long: siliques broadly linear to narrowly oblong, compressed, obtuse to subacute, without apparent style, 6–16 mm. long, 1.6–2.5 mm. broad, strigose-setulose, with 20–48 seeds.—Nutt. in Torr. & Gray, *Fl. No. Am.* i. 108 (1838); Wats. *Bibl. Ind.* i. 59 (1878), many references, and in Gray, *Syn. Fl. N. Am.* 1<sup>1</sup>. 107 (1895); Britton in Britt. & Brown, *Ill. Fl.* ii. 141, fig. 1757 (1897); Rob. & Fern. in Gray, *Man.* ed. 7: 422, fig. 777 (1908); O. E. Schulz in Engler, *Pflanzenr.* iv<sup>106</sup>. 333 (1927). *D. filicaulis* Scheele, *Linnaea*, xxi. 583 (1848).—Dry rocky or sandy soil, barrens and open woods, Florida to Texas and northern Mexico, north to Kentucky, southern Illinois, Missouri, Kansas and Colorado.

West of our range passing into

Var. *LEIOCARPA* O. E. Schulz, l. c. 334 (1927).—Siliques glabrous.—Arkansas and Louisiana to Arizona.

Var. *HELLERI* (Small) O. E. Schulz.—Siliques ellipsoid-oblong, strigose, 4–8.5 mm. long, on pedicels only 1–3 mm. long: seeds fewer.—O. E. Schulz, l. c. (1927). *D. Helleri* Small, *Fl. Se. U. S.* 479 (1903). *D. ammophila* Heller, *Muhlenbergia*, i. 145 (1906).—Texas to southern California, locally north to Washington.

<sup>1</sup> In Agassiz, Lake Superior, 155 (1850), after listing *Draba arabisans*, Agassiz made the note: "A small species of *Draba* with yellow flowers, found at Michipicotin, was lost." This was undoubtedly *D. nemorosa*, var. *lejocarpa*, for the National Herbarium at Ottawa has a characteristic sheet of the latter: dry sand hills and banks, Michipicotin, July 27th, 1869, John Macoun, the number juggled in a misleading way. "No. (447. 178) 2014."

<sup>2</sup> See quotation from Engelmann under discussion of *D. brachycarpa*.

24. *D. reptans* (Lam.), comb. nov. Annual or winter-annual: stems filiform, simple or slightly to freely branching at base, the larger plants with depressed or diffuse branches, 0.2–1.5 dm. high, hispid below with simple, forking and sessile stellate hairs, glabrous above and on the rachis: leaves in a basal rosette and 1 or 2 pairs or groups of 3 crowded above it or at the base of the otherwise scapiform branches, spatulate-obovate, rounded at summit, entire or nearly so, bristly-ciliate, the upper surface coarsely bristly with long simple trichomes and often stellate, the lower surface with stellate and forking hairs: raceme in fruit short and subumbelliform, its axis 0.3–4 cm. long, glabrous: flowers dimorphic; the larger with oblong sepals about 2 mm. long and obovate white petals 3–5 mm. long; the smaller with narrowly oblanceolate petals equaling or shorter than the narrow sepals or wanting: fruiting pedicels divergent or arched-ascending, 1–7 mm. long, glabrous: siliques linear to narrowly oblong, obtuse, 0.5–2.2 cm. long, glabrous: seeds 15–60 (–80).—*Arabis reptans* Lam. Encycl. i. 222 (1783); Willd. Sp. Pl. iii<sup>1</sup>. 536 (1800); DC. Syst. ii. 242 (1821); Torr. & Gray, Fl. No. Am. i. 83 (1838). *D. caroliniana* Walt. Fl. Carol. 174 (1788); Willd. Sp. iii<sup>1</sup>. 427 (1800); Nutt. Gen. N. Am. Pl. ii. 62 (1818); DC. Syst. ii. 353 (1821) and Prodr. i. 171 (1824); and essentially all later authors, including O. E. Schulz in Engler, Pflanzenr. iv<sup>106</sup>. 331, fig. 31 (1927). *D. hispidula* Michx. Fl. Bor.-Am. ii. 28 (1803). *D. umbellata* Muhl. Cat. 60 (1813), renaming of *D. caroliniana* Walt. *Arabis rotundifolia* Raf. Am. Mo. Mag. ii. 43 (1817). *Tomostima caroliniana* (Walt.) Raf. Neogenyton, 2 (1825). *T. hispidula* (Michx.) Raf. l. c. (1825). *D. caroliniana*,  $\beta$ . *umbellata* Torr. & Gray, Fl. N. Am. i. 109 (1838), the longest-fruited extreme = *D. caroliniana*, var. *dolichocarpa* O. E. Schulz, l. c. 333 (1927).—Dry sands and ledges, Georgia to New Mexico, north to eastern Massachusetts. Rhode Island, Connecticut, southeastern and northern (Sackett's Harbor, Tasey in Gray Herb.) New York, eastern Pennsylvania, southern Ontario, Michigan, Wisconsin, Minnesota, North Dakota and Colorado; also locally, Washington and Oregon.

Var. *micrantha* (Nutt.), comb. nov. Siliques minutely hispid.—*D. micrantha* Nutt. in Torr. & Gray, Fl. N. Am. i. 109 (1838); Gray, Man. ed. 2: 37 (1856); Small, Fl. Se. U. S. 479 (1903); Rydb. Fl. Rky. Mts. 352 (1917). *D. caroliniana*, var. *micrantha* (Nutt.) Gray, Man. ed. 5: 72 (1867); Wats. in Gray, Syn. Fl. N. Am. i<sup>1</sup>. 106 (1895); Britton in Britt. & Brown, Ill. Fl. ii. 141 (1897); O. E. Schulz, l. c. 333 (1927). *D. coloradoensis* Rydb. Bull. Torr. Bot. Cl. xxxi. 555 (1904).—Chiefly western, Louisiana to southern California, north to Illinois, Minnesota, South Dakota, Montana and Washington.

The necessity to change the specific epithet arises through the fact that earlier authors, some of them cognizant of the properly published *Arabis reptans* Lam., have failed to apply the priority principle, which it is often a temptation to overlook! Willdenow, DeCandolle

and others in Europe, unfamiliar with American plants, accepted *A. reptans* at its face value as an *Arabis*; and even Pursh, who should have known better, kept it up as *A. reptans* from "sandy fields: Pennsylvania to Virginia" (Pursh, Fl. Am. Sept. 437) and on another page (433) maintained *Draba hispidula* Michx. (with the earlier *D. caroliniana* Walt. as a synonym), apparently without suspecting the identity. The recognition of the probable identity apparently started with Torrey & Gray, who relegated *A. reptans* to the doubtful species, with the pertinent query: "Is it *Draba Caroliniana*?" In his Bibliographic Index (1878) Watson entered *A. reptans* doubtfully in the synonymy of *D. caroliniana*, but in the Synoptical Flora the doubt was unexpressed; and Schulz gives this name of 1783 unequivocally in the synonymy of *D. caroliniana* (1788).

*Draba reptans* rests upon *Arabis reptans* Lam. which was based solely on *Paronychia Myosotis Virginiana, foliis subrotundis* of Plukenet, Phytogr. t. li. fig. 5 (1691) and Almag. 281 (1699). Plukenet's figure, like so many of his drawings of American plants, is very definite to one who knows the flora. It is here reproduced as TEXT-FIG. 1; and it is well matched by many specimens from eastern America, while Lamarck's description of it is unequivocal.

The maintenance by some authors of *D. micrantha* or *D. coloradoensis* as a species merely because it has hispid, instead of glabrous siliques, seem unjustified. Similar variations without other characters occur in many species: for example, *D. nemorosa* (typical) with siliques strigose-hispid, var. *lejocarpa* (*D. lutea*) with them glabrous; *D. cuneifolia* with strigose-hispid siliques, var. *leiocarpa* with them glabrous, etc., etc.



FIG. 1. Type of *DRABA REPTANS*, after Plukenet.



25. *D. VERNA* L. *Small annual or winter-annual, flowering chiefly in early spring: leaves all in a basal rosette, oblanceolate or spatulate, entire or dentate, more or less pilose on the upper surface with simple, bifurcate and stellate trichomes, 0.5–2.5 cm. long: scapes 1–several and very unequal, filiform, in fruit elongating to 0.3–3 dm. high, glabrous or nearly so: raceme at first corymbiform, in fruit becoming elongate and lax, the lower pedicels then 0.4–3 cm. long, ascending: sepals ovate to obovate, with rounded tips, 1–2 mm. long, glabrous or hispid on the back: petals white, bifid half their length, 1.5–2.5 mm. long: siliques narrowly oblong-elliptic, 4–10 mm. long, 1.5–2.3 mm. broad, glabrous, with 40–60 seeds.*—Sp. Pl. 642 (1753); Pursh, Fl. Am. Sept. 433 (1814); Barton, Fl. N. Am. iii. 49, t. 88 (1823); Torr. & Gray, Fl. N. Am. i. 109 (1838); Watson in Gray, Syn. Fl. N. Am. i.<sup>1</sup> 106 (1895). *Erophila vulgaris* DC. Syst. ii. 356 (1821). *E. verna* (L.) E. Meyer in Preuss, Pflanzengatt. 179 (1839); O. E. Schulz in Engler, Pflanzenr. iv.<sup>105</sup>. 345 (1927), which see for very detailed bibliography.—Roadsides, fields and other open, dry habitats, Massachusetts to Ohio, Kentucky, Tennessee and North Carolina; southern British Columbia to California. Naturalized from Europe. Much less frequent than

Var. *AESTIVALIS* Lejeune.—*Siliques broadly elliptic, elliptic-obovate or rounded, 2.5–6 mm. long, 2–4 mm. broad; seeds fewer.*—Rev. Fl. Env. Spa, 128 (1824); Wildem. & Dur. Prodr. Fl. Belg. iii. 346 (1899). *D. Boerhaavii* Van Hall, Specim. Bot. 149 (1821). *D. verna* Bigel. Fl. Bost. ed. 2: 250 (1824); Gray, Gen. i. 160, t. 69 (1848); Britton in Britt. & Brown, Ill. Fl. ii. 140, fig. 1755 (1897). *Erophila Boerhaavii* (Van Hall) Dumortier, Fl. Belg. 120 (1827); O. E. Schulz, l. c. (1927), which see for many synonyms and references.—More frequent, Massachusetts to southern Ontario, south to Georgia and Tennessee; Washington and Oregon. Naturalized from Europe.

Var. *aestivalis* is treated as a species, *Erophila Boerhaavii*, by Schulz, distinguished in his key from *E. verna* by “Siliculae abbreviatae, breviter obovoideae vel subrotundatae. Ovarium 24–48-ovulatum” as opposed to the “Siliculae oblanceolatae” and “Ovarium 44–60-ovulatum” of *E. verna*. But in the detailed descriptions the “oblanceolate” siliques of *E. verna* become “oblongo-ellipsoideae,” while *E. verna*, var. *oedocarpa* (E. Drabble) O. E. Schulz has them “anguste obovato-lanceolatae,” var. *cochleata* (Rosen) O. E. Schulz has them “ovoideae, subtumideae,” and var. *Charbonnelii* (H. Sudre) O. E. Schulz has them “6 mm longae, 2.5–3 mm latae,” proportions most difficult to reconstruct into “oblanceolate.” Incidentally, the key-character of *E. Boerhaavii*, “Ovarium 24–48-ovulatum,” changes in the fuller description to “Ovarium ovulis 32–18.”

I have, consequently, taken up, with full appreciation of the possible doubt involved, the name *Draba verna*, var. *aestivalis* Lejeune. In an Old World group wherein some authors have seen nearly 200 "species" while others (Rouy & Foucaud, for example) see in France alone 8 subspecies with 57 recognized varieties and forms it is not safe to be dogmatic. Lejeune's brief description is satisfactory:

*Var. aestivalis* N. siliculis ovatis, convexis, pedicello brevioribus; foliis sublinearibus.

*Obs.* La première variété . . . , la deuxième [var. *aestivalis*] se distingue par la forme de ses fruits qui sont beaucoup plus courts et à valves bombées, ce qui leur donne une forme plus arrondie.

Schulz cites *Draba verna*, var. *aestivalis* (1824) as an unquestioned synonym of his *Erophila Boerhaavii*, but he also gives, as his basis of *E. Boerhaavii* the earlier "*Draba verna* L.  $\beta$ . *Boerhaavii* Van Hall, Specim. bot. (1821) 149." I have not seen Van Hall's account, but it is significant that in quoting it (his footnote, p. 359) Schulz makes it clearly appear that Van Hall was publishing a binomial, *D. Boerhaavii*:

A *Draba verna vulgari* valde differt siliculis duplo latioribus et brevioribus, statura longe minori. Nonne haec insignis formae siliculae differentia satis magni momenti est habenda, ut tamquam species, nomine *Drabae Boerhaavii*, a *D. verna* distinguatur? (Hall l. c.).

*Index Kewensis*, likewise, gives *Draba Boerhaavii* Van Hall unequivocally as a binomial.

Another set of synonyms usually cited under *Draba verna* rests for typification directly upon *D. verna*,  $\beta$ . *americana* Pers. Syn. ii. 190 (1807). These are *Erophila americana* (Pers.) DC. Syst. ii. 356 (1821); *E. vulgaris*, var. *americana* (Pers.) Darl. Fl. Cestr. 378 (1837) and *D. americana* (Pers.) Hook. f. & Jackson, Ind. Kew. ii. 792 (1893). The pedicels of *D. verna* are ordinarily strongly ascending or but slightly arching: but the brief description given by Persoon under *D. verna* was

$\beta$ . *americana*, silicul. longioribus deflexis. Hab. in Europae et Americae aridis,

a wholly unconvincing account of a plant with ascending fruit! Later authors doubtless had forms of *D. verna* before them but it is doubtful if Persoon did. *Erophila verna*, var. *americana* (Pers.) O. E. Schulz, l. c. 355 (1927) is kept up by Schulz for a plant of Europe and of "Arkansas (Rafinesque, hb. Deless.)" but he says nothing about the siliques being "deflexed."

(To be continued)

HOST PLANTS OF *CUSCUTA GRONOVII*<sup>1</sup>

H. L. DEAN

DURING the summer of 1930 while studying the flora of West Virginia the writer had most favorable opportunity for observing the host relations of *Cuscuta Gronovii* Willd. This species of *Cuscuta* occurring, as it does, very commonly throughout the state facilitated the many observations made. At the suggestion of Professor P. D. Strausbaugh, of West Virginia University, a record of host plants was compiled for this species of dodder.

Since subsequent examination of the literature indicates that no extensive list of specific host plants for *C. Gronovii* has been published, it is believed that the appended list should be of interest. Although practically all representative areas of West Virginia were visited by the writer, doubtless further study would add new species to the present list.

Early writers believed that a given species of *Cuscuta* infested only one species of host plant. In harmony with this belief Engelmann (1842) in his earlier monograph of the genus named several species of *Cuscuta* after the genera of plants upon which they grew. A year later (1843) he published his "Additions and Corrections to a Monography of North American Cuscutineae" and stated: "I am now convinced, that, although many Cuscutae prefer some plants to others, yet there is no constancy in this respect, but the same species often grows upon a great variety of widely different plants. I did wrong, therefore, to name them from the genera upon which they grew; and I should much prefer to see the names of *C. Cephalanthi* changed into *C. tenuiflora*, *C. Coryli* into *C. incurva*, *C. Saururi* into *C. umbrosa* Beyr., *C. Polygonorum* into *C. chlorocarpa*, and *Lepidanche Compositarum* into *L. squarrosa*, if they had not yet been published."

Hooker (1899) reported *C. Gronovii* as parasitizing "grass, solidago, alder, and the like." Munte (1902) on the other hand stated that this species did not attack *Solidago* but preferred *Impatiens* or *Eupatorium*. Yuncker (1919) described this species of dodder for Indiana and stated that it was often found growing on onions, tomatoes and occasionally on *Equisetum*. In the same paper this author expressed the belief that *C. Gronovii* would grow on any host within reach.

<sup>1</sup> Published with aid to RHODORA from the National Academy of Sciences.



Moss (1928), studying the haustorium of *C. Gronovii*, listed four host plants for this species, viz. *Monarda mollis* L., *Lathyrus ochroleucus* Hook., *Artemisia gnaphalodes* Nutt. and *Symphoricarpos racemosus* Michx. Yuncker (1932) in a later monograph listed 31 genera of host plants for this species of dodder. Fourteen of this number of host genera were not observed by the present writer in West Virginia and are designated in the following list, as taken from Yuncker's later Monograph, by an asterisk (\*). Concerning *C. Gronovii* Yuncker stated (1932), "this species shows no specialization of hosts but grows on a large number of different species of herbaceous and woody plants, e.g., *Rubus*, *Cephalanthus*, *Aster*, *Solidago*, *Dianthera*, \**Tecoma*, *Impatiens*, *Eupatorium*, *Polygonum*, *Salix*, \**Saururus*, *Hypericum*, *Desmodium*, *Rhus*, \**Vernonia*, \**Rudbeckia*, \**Pelargonium*, *Laportea*, *Lactuca*, *Phytolacca*, *Artemisia*, \**Solanum*, \**Allium*, \**Polypodium*, \**Urtica*, \**Chrysanthemum*, \**Mikania*, *Boehmeria*, \**Acalypha*, \**Jussiaea*, \**Mecosphaerum*, etc." The present writer's observations support the later belief of Engelmann and corroborate the statements of Yuncker.

Eighty-three species of host plants, all Angiosperms,<sup>1</sup> were listed by the writer for *C. Gronovii* during the summer of 1930. Of these plants 59 are herbaceous, three twiners, three woody vines, six shrubs, six trees, two sedges and four grasses. Twenty-nine families and sixty-eight genera are represented in this list.

A majority of the infested plants were found growing in low, moist, places under conditions similar to those present along creek and river banks, wet bottom-lands and various poorly drained areas. In the case of the trees and shrubs only the younger parts, or shoots, were attacked while both young and mature herbaceous plants were infested.

In conjunction with certain experiments at the State University of Iowa additional infestations were brought about. Host plants of *C. Gronovii* thus added to the 1930 list include *Helianthus annuus* L., *Fagopyrum esculentum* Moench., *Cucurbita maxima* Duchesne, *C. Pepo* L., *Cucumis sativus* L. and *C. Melo* L. These plants, grown and infested under greenhouse conditions, increase the total number of host plants observed by the writer for *C. Gronovii* to eighty-nine species.

<sup>1</sup> Species of *Cuscuta* have previously been reported, except for Yuncker's reference to *Equisetum*, as parasitizing Angiosperms only. Singh (1933), however, has succeeded in growing *C. reflexa* upon one fern, *Athyrium pectinatum* Wall.

ALPHABETICAL LIST OF HOST PLANTS OF *CUSCUTA GRONOVII* WILLD.<sup>1</sup>

- Acer* Negundo L.  
*A. saccharinum* L.  
*Achillea* Millefolium L.  
*Actinomeris alternifolia* (L.) DC.  
*Agrimonia parviflora* Ait.  
*Ambrosia trifida* L.  
*A. artemisiifolia* L.  
*Anemone virginiana* L.  
*Apios tuberosa* Moench.  
*Aster prenanthoides* Muhl.  
*Betula nigra* L.  
*B. lutea* Michx. f.  
*Bidens bipinnata* L.  
*Boehmeria cylindrica* (L.) Sw.  
*Carex lurida* var. *gracilis* (Boott) Bailey  
*Cephalanthus occidentalis* L.  
*Chenopodium album* L.  
*Chelone glabra* L.  
*Cicuta maculata* L.  
*Cimicifuga racemosa* (L.) Nutt.  
*Clematis virginiana* L.  
*Convolvulus sepium* L.  
*Cryptotaenia canadensis* (L.) DC.  
*Cucurbita maxima* Duchesne.  
*Cucurbita Pepo* L.  
*Cucumis sativus* L.  
*C. Melo* L.  
*Daucus Carota* L.  
*Desmodium canescens* (L.) DC.  
*Dianthera americana* L.  
*Elymus virginicus* L.  
*Epilobium adenocaulon* Haussk.  
*Erigeron canadensis* L.  
*E. annuus* (L.) Pers.  
*Eupatorium perfoliatum* L.  
*E. purpureum* L.  
*E. urticaefolium* Reichard.  
*Fagopyrum esculentum* Moench.  
*Galinsoga parviflora* var. *hispida* DC.  
*Galium Aparine* L.  
*Glycine soja* Sieb. & Zucc.  
*Helianthus annuus* L.  
*Hydrangea arborescens* L.  
*Impatiens pallida* Nutt.  
*I. biflora* Walt.  
*Ipomoea pandurata* (L.) G. F. W. Mey.  
*Kalmia latifolia* L.  
*Lactuca scariola* L.  
*L. saligna* L.  
*Laportea canadensis* (L.) Gaud.  
*Medicago sativa* L.  
*Melilotus alba* Desr.  
*M. officinalis* (L.) Lam.  
*Menispermum canadense* L.  
*Monarda mollis* L.  
*Oenothera biennis* L.  
*Oxalis corniculata* L.  
*Panicum clandestinum* L.  
*Perilla frutescens* (L.) Britton  
*Phytolacca decandra* L.  
*Phleum pratense* L.  
*Plantago Rugelii* Dene.  
*P. lanceolata* L.  
*Polygonum sagittatum* L.  
*P. Hydropiper* L.  
*Poa pratensis* L.  
*Prunella vulgaris* L.  
*Ranunculus recurvatus* Poir.  
*Rhus Toxicodendron* L.  
*Rosa carolina* L.  
*Rubus canadensis* L.  
*Rumex obtusifolius* L.  
*R. crispus* L.  
*Sambucus canadensis* L.  
*S. racemosa* L.  
*Salix nigra* Marsh.  
*S. sericea* Marsh.  
*Scirpus americanus* Pers.  
*Sida spinosa* L.  
*Solidago rugosa* Mill.  
*S. sp.*  
*Stachys tenuifolia* var. *aspera* (Michx.) Fernald.  
*Ulmus fulva* Michx.  
*Verbesina occidentalis* Walt.  
*Viola papilionacea* Pursh.  
*Vitis cordifolia* Michx.  
*Trifolium pratense* L.  
*Teucrium canadense* L.  
*Xanthium canadense* Mill.

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<sup>1</sup> Nomenclature following Gray's Manual of Botany (7th edition) in most instances

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UNIVERSITY OF IOWA

#### RECENT ADDITIONS TO THE FLORA OF ST. LOUIS COUNTY, MISSOURI.

—Although St. Louis county is as well known botanically as any other county in Missouri, species new to its flora are being found each year as a result of more careful search along railroad rights-of-way, ballast and other waste ground, and sand-bars and mud flats along the Mississippi and Missouri Rivers. In the summer of 1931 *Pieris Sprengeriana* Poir. was collected for the first time in Missouri along railroad tracks in St. Louis Co. During the summer and autumn of 1933 the writer found several species in St. Louis Co. which proved to be new additions to the flora of that county. These additions are *Nicotiana longiflora* Cav. and *Datura Metel* L. from ballast ground near the Mississippi River in South St. Louis; *Solanum Torreyi* Gray and *Croton Engelmanni* Ferg. along railroad tracks in St. Louis; *Solidago rugosa* Mill. in low woods along the Mississippi River north of Chain-of-Rocks; *Rubus trivialis* Michx.<sup>1</sup> from low alluvial woods along the Meramec River near its confluence with the Mississippi; and *Tamarix gallica* L. and *Corispermum hyssopifolium* L. from sand-dunes on an island at the junction of the Missouri and Mississippi Rivers. The last two species are interesting discoveries. The former had been known only from along the sand-bars in Jackson Co., extreme western Missouri, where it had been first reported for the state in 1932. Only two small plants of *Tamarix* were found on the island, the seeds probably having but recently been transported from further west along the Missouri River. The latter, *Corispermum hyssopifolium*, had been known previously in Missouri from only two western counties, namely, Jackson and Clay. This species was growing profusely on the sand-dunes which covered this island, and together with *Cycloloma atriplicifolium* (Spreng.) Coult., comprised the dominant vegetation. Other ammophilous species, such as *Sporobolus cryptandrus* (Torr.) Gray and *Triplasis purpurea* (Walt.) Chapm., occurred on the xerophytic dunes of the island. The occur-

<sup>1</sup> Also *Smitlax Bona-nox* L.



rence of such western species as *Corispermum hyssopifolium* and *Cycloloma atriplicifolium* as far east as the Mississippi River is an interesting fact, both species being known as far east as the Great Lakes area.

Other collections made by the writer in St. Louis Co. during the season of 1933 which are rare but not new to the county include *Kochia scoparia* (L.) Schrad., *Chenopodium Botrys* L., *Leersia lenticularis* Michx., *Vitis palmata* Vahl., *Quercus lyrata* Walt., *Cynodon Dactylon* (L.) Pers., *Ipomoea coccinea* L., *Parosela leporina* (Ait.) Rydb. var. *alba* (Michx.) Macbride, and *Acnida tuberculata* Moq. var. *subnuda* Wats.—JULIAN A. STEYERMARK, Missouri Botanical Garden, St. Louis, Mo.

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ANTENNARIA PLANTAGINIFOLIA WITH ROSY INVOLUCRES.—A small patch of staminate plants of *Antennaria plantaginifolia* (L.) Richards. with rosy-pink involucres was found May 2, 1934 on a dry hill of glacial drift in the meadows at East Lexington, Massachusetts. These plants were surrounded by many other staminate and pistillate plants, all with white involucres. On May 11, the inflorescences had become loose and the involucres had faded so that they were just noticeably pink. According to Professor Fernald the European plant, *Antennaria dioica* (L.) Gaert., has rosy involucres just as often as white or straw-colored ones; he has not previously seen pink involucres in our plant.—RUTH PEABODY, Radcliffe College.

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TRILLIUM GRANDIFLORUM IN NEW HAMPSHIRE.—“*Trillium grandiflorum*, new to New Hampshire” was the enthusiastic comment of Prof. Fernald as he and the members of the Radcliffe Botany 10 field-excursion stood in a colony of these plants which had caught my eye as we passed the locality in the automobile. The Trilliums were growing in a perfectly natural setting with *Veratrum viride* and *Osmunda cinnamomea*, forming an association in open mixed woods. This colony in the western part of the township of Bethlehem, New Hampshire, is the first known for the species in the state. Except for two stations in eastern Vermont, one in Thetford the other in Woodstock, mentioned by Jesup in his “Flora and Fauna within thirty miles of Hanover, New Hampshire,” 1891, and a colony in Chester-ville, Maine, it is the only one known east of the Green Mountains.—A. R. HODGDON, Harvard University.

Volume 36, no. 429, including pages 309-348 and plates 299-313, was issued 8 September, 1934.

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